INFORMATION

from the Greater St. Louis Citizens' Committee for Nuclear Information
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LATEST REPORT ON STRONTIUM 90 IN ST. LOUIS MILK: 17.6% of MPC

A check with the U. S. Public Health Service on November 20th reveals that the most recent test of milk from the St. Louis milkshed (sample collected in August 1958) shows 14.1 micro-microcuries of fall-out Strontium 90 per liter of milk. This is 17.6% of the maximum permissible concentration. (The meaning of the term MPC is explained in the text of this Information bulletin.) The August figure is lower than the July test results.

RADIOACTIVITY IN MILK RISES RAPIDLY IN PAST YEAR

Tests of milk show wide variation geographically and from month to month, but with a general rise in Strontium 90 content. St. Louis milk averaged higher in radioactivity over the year than other areas tested, with the July sample up to 23.37% of the MPC.

OTHER SOURCES OF STRONTIUM 90 IN OUR DIET

A comparative study of many different kinds of food produced before and after nuclear bomb tests has been made by the Food and Drug Administration. Strontium 90 content is rising in varying degrees in the foods tested. Tea leaves show more than the maximum permissible concentration.

ANTLERS IN THE LABORATORY

Elk and deer antlers provide scientists with a record of the amount of Strontium 90 in the year of their growth and in the area from which they come. Scientists in Scotland find last year's antlers 11 times as "hot" as those of 1952.

RADIOACTIVITY IN ST. LOUIS MILK

We now have information on all the studies of milk for Strontium 90 which have been made during the past year. This includes monthly tests of samples from the milksheds of St. Louis and four other metropolitan areas made by the U. S. Public Health Service. It also includes studies of the milk of other areas made by the Health and Safety Laboratory of the Atomic Energy Commission. (Strontium 90, a radioactive product of nuclear explosions, falls on the earth and is absorbed from the soil by plants. The milk of cows eating these plants contains Strontium 90).

The most recent U. S. Public Health figures for St. Louis are 18.7 micromicrocuries of Strontium 90 per liter of milk (Strontium units) in July 1958 and 14.1 Strontium units in August 1958. The first monthly test, in April 1957, showed 6.5 Strontium units. Before 1945 Strontium 90 was completely absent. Both in July 1958 and in the yearly average (10.2) St. Louis showed the highest Strontium 90 content of any of the five areas studied, but this was not uniform throughout the year. Each of the areas tested highest in at least one month.

(See graph showing April 1957 - July 1958 figures for St. Louis - p.3)

Is This Dangerous?

How dangerous is this increase in the Strontium 90 content of our St. Louis milk?

First, it must be said that we do not yet know with any certainty the consequences of the intake of Strontium 90 into the human body. The reason for this is that the present human generation is the first to receive any Strontium 90. Radioactive Strontium did not exist prior to the first nuclear explosion. We do know that it goes to the bone, like calcium, with more than average concentrations in the breast bone and vertebra. All scientists who have concerned themselves with this problem agree that Strontium 90 in sufficient quantities can cause bone cancer and leukemia. In very large amounts it can cause radiation sickness and death. The amounts now absorbed from food are much lower. Just how much is "sufficient" to be dangerous has not been precisely determined, but some very rough estimates can be made.

The only measuring rod available is the "maximum permissible concentration" (MPC) set by the International Committee on Radiological Protection. The MPC is determined from past medical experience with the effects of radioactive materials -- such as radium -- that have previously been absorbed by humans. Strontium 90 is chemically similar to radium, and like radium also accumulates in the bones A rough estimate of the amounts of Strontium 90 that can be tolerated by the body without medical harm can be obtained by comparison with the known effects of different amounts of radium. For milk, the MPC has been set at 80 micromicrocuries of Strontium 90 per gram of calcium (or 80 "Strontium units"). One liter of milk contains about 1 gram of calcium so the MPC can also be expressed as 80 Strontium units per liter (roughly, one quart) of milk.

This means that a child whose calcium for bone and tooth growth is supplied by drinking milk which day in and day out contains 80 units of Strontium 90 will on the average receive the limit of Strontium 90 that can be safely tolerated. So in July 1958, when milk in St. Louis reached the level of 18.7 Strontium units, it contained 18.7/80 or a little less than 1/4 of the Strontium 90 level that according to present estimates may be allowed in milk for daily consumption.

Looking at the increase of 12.2 Strontium 90 units in a fifteen month period, we can see that if this rate of increase continues, we can expect to reach the maximum permissible concentration of Strontium 90 in milk in about 6 years from now. Whether this increase continues depends on how many more nuclear weapons are exploded in this time.

It should be remembered that the MPC is based on an average tendency to absorb Strontium 90 from milk and an average susceptibility to its radiation. Actually people differ so much that some individuals can probably tolerate more Strontium 90 in food and others less than the average MPC indicates.

An added problem is that Strontium 90 is absorbed from other foods as well. The Strontium 90 content of various foods is quite variable, and may exceed that of milk. For example, a recent AEC publication (HASL-42, Oct. 1958) reports that in 1957 samples of okra, spinach and turnip greens grown in Tennessee contained 18.0, 1.2 and 21.3 Strontium 90 units respectively. Depending on dietary habits, vegetables or cereals may be more important sources of Strontium 90 than milk. Our knowledge of these complex problems is still very slight.

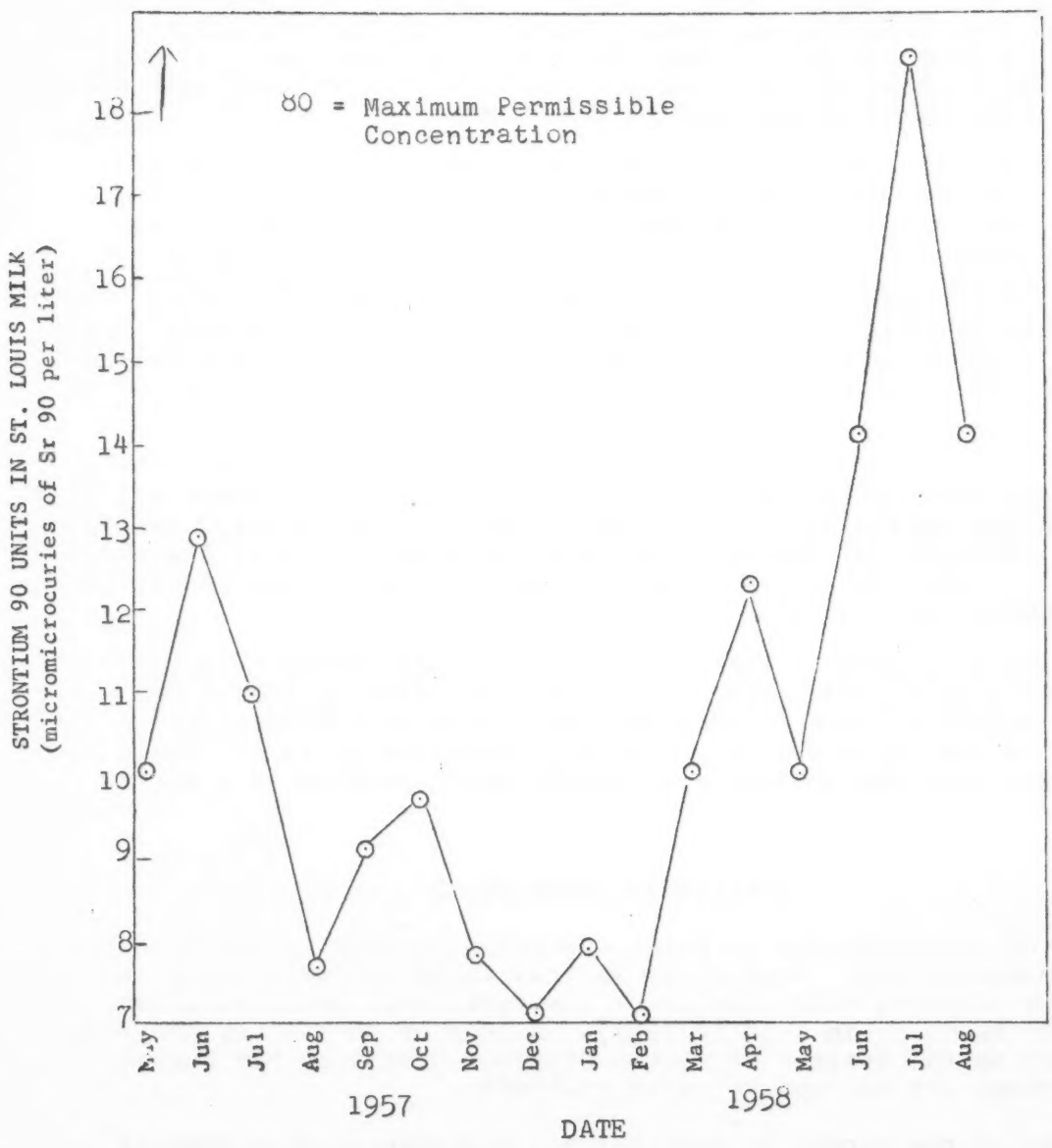
AEC Milk Studies

When we turn to studies of milk made by the AEC some other factors come to our attention.

One of these studies dealt with powdered milk from various areas in one of which -- Mandan, North Dakota -- the Strontium 90 content went up to 32.74 Strontium units (reported in HASL-42, Oct. 1958, p. 65). This was in August 1957. During that month St. Louis showed 7.4, New York 5.6, Sacramento, Salt Lake City and Cincinnati all 0. This is a tremendous range of difference, and immediately raises the question: What about untested areas? Do we have any way of knowing that the high Mandan figure was not exceeded somewhere else where the milk was not tested? Do any parts of the country produce milk that is consistently low in Strontium 90?

Another AEC study took monthly samples from several different dairies in Chicago. The significant thing about this study was that it revealed considerable variations from one dairy to another in the same area. Milk from one dairy showed twice as much Strontium 90 as another in each of three months. Public Health Service tests of St. Louis milk were made on samples of mixed milk obtained from many farms. We may expect that some farms produce milk that

STRONTIUM 90 IN ST. LOUIS MILK
(From U. S. Public Health Service Monthly Reports)



has significantly less than the average Strontium 90 in mixed St. Louis milk, while milk from other farms has more than the average.

Need For Further Information

The inescapable conclusion from the AEC studies is that if we are to have at all an accurate picture of human absorption of Strontium 90 we must have much wider testing geographically, and much more intensive testing from each locality.

The U. S. Public Health Service began in June of this year to test the milk from 5 additional areas: Fargo, North Dakota; Atlanta, Georgia; Austin, Texas; Spokane, Washington and Chicago, Illinois. This makes a total of ten milksheds now being tested, but this still leaves large parts of the country untouched.

The increase of Strontium 90 during the past year was caused by nuclear weapons tests made by the U. S., USSR and Great Britain. Nuclear testing in this time was at the highest rate in history (see CNI Information Bulletin, Oct. 24, 1958). Atomic energy for industrial use also produces Strontium 90, but it is not thrown up into the atmosphere and the stratosphere as in weapons testing. Atomic wastes from experimental and industrial plants present serious disposal problems, but these wastes do not appear to influence the Strontium 90 content of our milk.

Strontium 90 In The Future

If nuclear testing is abandoned by all governments and there are no more nuclear explosions, it will still be a matter of years before all the Strontium 90 thrown up by past explosions reaches the earth, and still longer before it disappears from the soil, the plants, and consequently from the milk.

If testing continues at the 1957-1958 level, St. Louis milk may reach the danger point marked by the MPC sometime in 1964. Of course, should H bombs be used in a war, even though none are dropped on the territory of the U. S., Strontium 90 in St. Louis milk could pass the maximum permissible concentration in a matter of weeks.

FALLOUT IN OTHER FOODS

A study of radioactivity in foods was recently made by the Food and Drug Administration. Samples of various foods produced prior to 1945 were compared with samples of the same foods produced after 1945 (for example, in 1956 or 1957). A copy of the survey has been requested by the Greater St. Louis Citizens Committee for Nuclear Information, but has not yet been received.

A summary of the survey in Chemical and Engineering News reports that the Strontium 90 content of tea leaves has passed the MPC of

80 micromicrocuries per kilogram. However, when the tea is brewed, only 17% of the radioactivity is extracted, so that tea in the cup is still below the MPC.

According to the Food and Drug Administration, other foods showing significant increases in radioactivity (though less than tea) are dairy products, seafoods and cocoa. Potatoes, corn, beans, peas, beets, turnips, carrots, spinach and various fruits were reported to show no significant increase. However, an AEC report (HASL-42, Oct. 1958, pages 88-89), shows significant amounts of Strontium 90 in some of these foods in 1956-1957 (expressed as Strontium 90 units): Peas, 1.3-21.3; beans, 4.6-20.2; corn, 1.6-28.4; potatoes 6.1-8.7; spinach, 1.2-13.9. It should be recalled that 80 Strontium units represents the maximum permissible concentration. We hope to report on this survey in greater detail in a later issue of this monthly Information Bulletin.

HUNTING STRONTIUM 90

Antlers have a more important place in the laboratory than over the fireplace this hunting season. Deer and elk get calcium and also Strontium 90 in their forage, and some of this is deposited in their antlers. Unlike bones, antlers are formed in one year, so they can be used as an indicator of the prevalence of Strontium 90 in any one year.

1952 Antlers from the Island of Ismay were compared with 1957 antlers from the same place, by scientists from the Royal College of Surgeons in Glasgow, Scotland. A 1952 antler showed 11.2 micromicrocuries of radioactivity, a 1957 antler 11 and a quarter times as much, or 126 micromicrocuries.

Dr. Ernest C. Anderson of Los Alamos' Biomedical Research Group has asked for elk and deer antlers. Anyone wishing to contribute their hunting trophies for this scientific investigation should first write to Dr. Anderson, telling him the year and place where they were collected.